

# A peer learning intervention for nursing students in clinical practice education: A quasi-experimental study



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## ABSTRACT

**Background:** Studies of peer learning indicate that the model enables students to practice skills useful in their future profession, such as communication, cooperation, reflection and independence. However, so far most studies have used a qualitative approach and none have used a quasi-experimental design to study effects of nursing students' peer learning in clinical practice.

**Objectives:** To investigate the effects of peer learning in clinical practice education on nursing students' self-rated performance.

**Design:** Quasi-experimental.

**Setting:** The study was conducted during nursing students' clinical practice.

**Participants:** All undergraduate nursing students ( $n = 87$ ) attending their first clinical practice were approached. Seventy students out of 87 answered the questionnaires at both baseline and follow-up (42 of 46 in the intervention group and 28 of 39 in the comparison group).

**Methods:** During the first two weeks of the clinical practice period, all students were supervised traditionally. Thereafter, the intervention group received peer learning the last two weeks, and the comparison group received traditional supervision. Questionnaire data were collected on nursing students' self-rated performance during the second (baseline) and last (follow-up) week of their clinical practice.

**Results:** Self-efficacy was improved in the intervention group and a significant interaction effect was found for changes over time between the two groups. For the other self-rated variables/tests, there were no differences in changes over time between the groups. Studying each group separately, the intervention group significantly improved on thirteen of the twenty variables/tests over time and the comparison group improved on four.

**Conclusions:** The results indicate that peer learning is a useful method which improves nursing students' self-efficacy to a greater degree than traditional supervision does. Regarding the other self-rated performance variables, no interaction effects were found.

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## 1. Introduction

Over the past two decades, the learning environment in nursing clinical practice education has received increased attention. Different learning models have been discussed (Henderson et al., 2011), one of which is peer learning. Peer learning, in focus here, entails nursing students supporting and learning from each other while working in pairs, without the immediate influence of the preceptor. Learning together

means that students working in pairs are given the opportunity to practice critical thinking, collaboration, reflection, problem-solving and independence (Carlson, 2012). We report on an intervention study on peer learning in clinical practice education.

## 2. Background

Peer learning is used as an umbrella concept for a group of approaches that includes group or paired learning, defined by Boud (2001, p. 4) as 'Students learning from and with each other in both formal and informal ways' and by Topping (2005, p. 631) as 'The acquisition of knowledge and skill through active helping and supporting among status equals or matched companions'. It involves people from similar social groupings, who are not professional teachers, helping each other to learn and learning themselves by doing so. Peer learning

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puts the students' own learning in focus and not the preceptors' instruction. It originates from social learning theories, which claim that experience, understanding and knowledge-building are shaped and developed in interactions between humans (Säljö, 2014).

In systematic reviews (Baldry Currens, 2003; Secomb, 2008; Stone et al., 2013), the umbrella concept of peer learning has been depicted as a model that has positive effects. Use of peers in clinical practice education, i.e. clinical practice, is increasing in health professional education, because it gives students opportunities to acquire skills when they learn from the interaction. Previous, primarily qualitative research on nursing students in similar contexts as in the present study, i.e. enrolled in the same course where peer learning is used during clinical practice, has revealed several positive outcomes. Students described improved problem-solving, discussion and reflection (Hellström-Hyson et al., 2012; Morris and Stew, 2007; Stenberg and Carlson, 2015), improved teamwork skills (Chojcecki et al., 2010), and communication comprehension (Chojcecki et al., 2010; Hellström-Hyson et al., 2012). Furthermore, students have expressed that learning with a peer improves the learning process (Stenberg and Carlson, 2015) and enables closer contact with patients (Hellström-Hyson et al., 2012). Other expressed benefits are that the model gives students a sense of independence (Hellström-Hyson et al., 2012), reduces student anxiety (Chojcecki et al., 2010; Stenberg and Carlson, 2015), and increases self-efficacy (Austria et al., 2013; Hellström-Hyson et al., 2012). Self-efficacy can be described as an individual's belief in his/her own ability to succeed in a particular situation. People with high self-efficacy are more likely to view challenging problems as something to be handled rather than something to be avoided (Bandura, 1997). Zhao et al. (2015), for example, found a positive relationship between self-efficacy and the use of problem-solving behavior among nursing students in clinical practice. Expressed disadvantages of peer learning, found in contexts similar to that in the present study, include limited opportunities to perform hands-on skills (Austria et al., 2013; Stenberg and Carlson, 2015), incompatibility in the pair (Austria et al., 2013), and destructive competition (Stenberg and Carlson, 2015). Creating learning environments with structural organizational conditions (i.e., access to structural empowerment) that develop students' knowledge and self-efficacy is important for the process of psychological empowerment during education in the form of meaning, competence, self-determination and impact (Bradbury-Jones et al., 2010). Two complementary perspectives on empowerment are described in the literature. Kanter's (1993) theory of structural empowerment describes access to structural conditions of importance in the environment. Spreitzer's (1995) psychological

empowerment describes how individuals experience their work as well as personal beliefs about their role in relation to the organization. Spreitzer (2006) also argued that employees with high psychological empowerment create working environments with high access to structural empowerment. To our knowledge, there are no intervention studies in the area addressing the effects of peer learning in the context of students enrolled in the same course during clinical practice education. Based on earlier research, our assumptions were that peer learning would stimulate students to solve problems, discuss and reflect together (Hellström-Hyson et al., 2012; Morris and Stew, 2007; Stenberg and Carlson, 2015). By taking care of patients together, students would also report having closer contact with patients (Hellström-Hyson et al., 2012). This, in turn, would influence nursing students' critical thinking, collaborative behavior, learning and development, satisfaction with provided care, perceived self-efficacy, psychological empowerment and, thereby, their access to structural empowerment (Fig. 1).

The aim of the present study was to investigate effects of a peer learning model on nursing students' self-rated performance. We hypothesized that nursing students who are given the opportunity to learn with a peer during their clinical practice education improve significantly, from baseline to follow-up, regarding their critical thinking, collaborative behavior as well as learning and development. We further predicted that they would rate greater satisfaction with provided care, perceived self-efficacy, psychological empowerment and access to structural empowerment over time. Moreover, we hypothesized that students using peer learning would improve more over time compared with nursing students receiving traditional supervision.

### 3. Methods

#### 3.1. Design

A quasi-experimental design was used, including an intervention and comparison group with baseline and follow-up assessment. During the last two weeks of a four-week period of clinical practice education, the intervention group engaged in peer learning, whereas the comparison group continued to receive traditional supervision (Fig. 2).

#### 3.2. Participants and Setting

All undergraduate nursing students attending their first clinical practice at a university in Sweden ( $n = 87$ ) were invited to participate. The students were in their second semester of a 3-year undergraduate

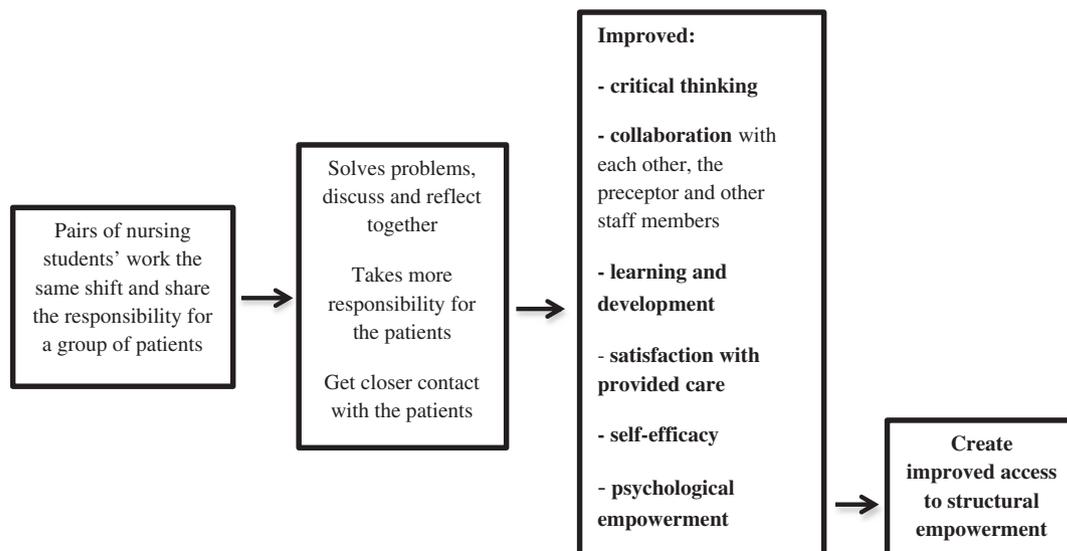


Fig. 1. Program logic assumption with measured outcomes showed in bold.

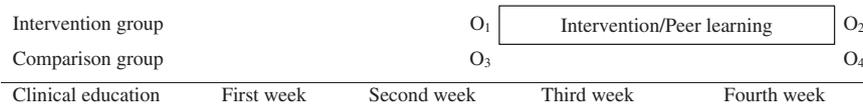


Fig. 2. Overview of the design with baseline assessment, intervention and follow-up assessments in the intervention and comparison groups. O = assessment.

nursing program. The practice took place in one of the three public hospitals in the region with learning environments that included several categories of staff, shift changes and patients with complex medical and nursing needs. Approximately one third of the nursing education program is made up of clinical practice. Registered nurses had been selected as preceptors; their role was to support students in the learning process and ensure patient safety. Furthermore, students were supported by a clinical lecturer responsible for the nursing students' progress and goal achievement, including assessing (Löfmark and Thorell-Ekstrand, 2004) and grading the students. The intervention (peer learning) was implemented through collaboration between the university and the county councils at eight of twenty departments, and students at these departments constituted the intervention group. The primary analysis was intention to treat and included all subjects as assigned with available 2-weeks outcome data. Two students were absent at the time of the baseline data collection, and of the 85 students who remained, 70 (82%) answered questionnaires at both baseline and follow-up (42 of 46 (91%) in the intervention group and 28 of 39 (72%) in the comparison group) (Fig. 3).

3.3. Intervention and Comparison Group

During the first two weeks of the clinical practice all students received traditional supervision, meaning that one preceptor supervised one nursing student at a time. Thereafter, students in the intervention group received peer learning during the last two weeks of the

placement, i.e. two students, enrolled in the same course, were paired together and supervised by one preceptor. The pair worked the same shift, supported each other and learned with and from each other. In both models, the preceptor's role was to support, reflect and give feed-back to the students. In traditional supervision, the preceptor played an active role as practice educator and the student learned the profession based on the preceptor's knowledge and experience, e.g., by observing and imitating the preceptor. With peer learning, the preceptor played a more unobtrusive role. The pair shared responsibility for a group of patients, they first planned care activities together, bounced ideas between each other and then informed their preceptor about their intended actions before delivering care. The preceptor's role was thus to support the students in solving any clinical problems that occurred. Students in the comparison group were supervised traditionally all four weeks.

All wards had a clinical lecturer who visited the ward several times a week. If there was any problem with a student or pair of students, the clinical lecturer was involved in solving it. The first author had regular contact with the clinical lecturers who checked whether the students in the intervention group were engaging in peer learning as intended. The clinical lecturers were familiar with both peer learning and traditional supervision.

3.3.1. Ethical Considerations

The study was approved by the Regional Ethical Review Board (Reg. no. 2013/528). Permission to conduct the study was obtained

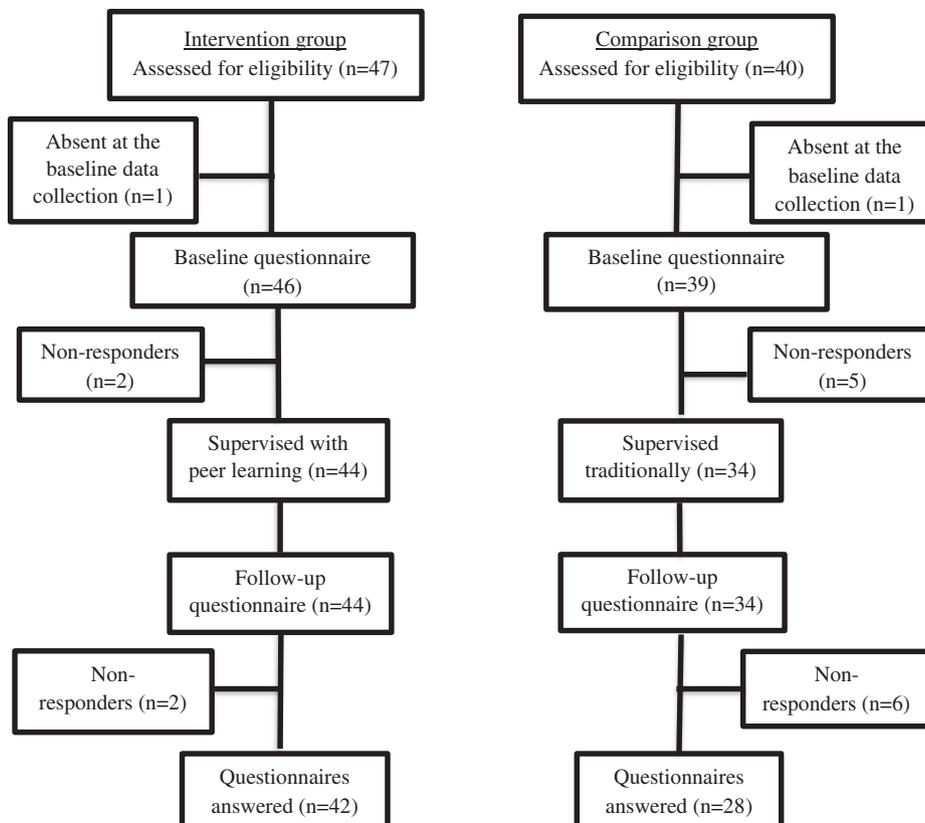


Fig. 3. Flow chart of participant enrollment for this quasi-experimental study.

from the head of the faculty at the university. The students received information about the study; voluntary participation and confidentiality were assured before collecting data. Furthermore, the participants were informed that they could withdraw from the study at any time, without any explanations or consequences.

### 3.4. Data Collection and Instruments

Baseline and follow-up data were collected using questionnaires in February and March 2014, respectively. Baseline data were collected during participants' second week of clinical practice, after they had received traditional supervision. The follow-up data were collected two weeks after baseline, at the end of the participants' practice period. The students received the questionnaire after a seminar and had the option of completing it directly on site or at home. Those who answered the questionnaire on site were given a blank envelope to put the questionnaire in and a box where all students could place their envelope. The students who completed the questionnaire at home were given a stamped reply envelope, addressed to the first author. The questionnaire took approximately 30 to 40 min to complete. A total of nine instruments were used, eight for the primary outcomes and one for the secondary outcome. In addition, items covering participants' demographic data (age, sex, living arrangements, previous higher education and work experience in health care) were included in the questionnaire. One reminder was sent out.

### 3.5. Primary Outcome Measures

#### 3.5.1. Critical Thinking

The 10-item Critical Thinking Likert Scale (CTLS; Stevens, 2009), with response options on a 6-point Likert-type scale where a higher score represents a higher own aptitude for and attitude toward critical thinking, was used. The CTLS was translated into Swedish by the research team, and back-translation was carried out by a bilingual translator (Polit and Beck, 2012). A factor analysis of the CTLS using principal component analysis revealed two factors with eigenvalues over one explaining 63.4% of the total variance (unpublished data for 185 nursing students conducted by the research group). The factors were named 'critical thinking related to nursing tasks' and 'critical thinking in general', including five items each. Internal consistency values for the CTLS and other instruments, measured as Cronbach's Alpha, are presented in the Results section.

#### 3.5.2. Collaborative Behavior

The Collaborative Behavior Scale Shortened (CBSS; Stichler, 2013) includes eight items ranked on a 4-point Likert-type scale; the higher the total score, the more collaborative the relationship. The CBSS was translated into Swedish by the research team, and back-translation was carried out by a bilingual translator (Polit and Beck, 2012). The CBSS has shown acceptable psychometric properties (Stichler, 2013).

#### 3.5.3. Learning and Development

The 11-item thriving scale (Porath et al., 2012) comprises two factors – vitality and learning – including five items each and a single item on over-all thriving, with response options on a 7-point scale where higher scores indicate greater levels of workplace thriving. The scale has shown acceptable psychometric values. Furthermore, an 8-item scale with response alternatives on a 5-point scale was used to measure nursing students' 'perception of overall learning outcomes' (Löfmark et al., 2012). The scale has been shown to be reliable (Kristofferzon et al., 2013).

#### 3.5.4. Satisfaction with Provided Care

The Nurse-specific Satisfaction with Care (NSC) questionnaire includes nine items ranked on a 7-point scale where 6 represents the highest level of satisfaction. The items were developed by Mårtensson

(2009), adapted from the Caring Assessment Instrument (CARE-Q) (Larson, 1981), and have been shown to be reliable (Mårtensson, 2009).

#### 3.5.5. Self-efficacy

The 9-item Nursing Self Efficacy Scale (NSE; Hagquist et al., 2009) is an 11-point scale where 11 represents the most positive perception of nursing self-efficacy. The scale is influenced by Bandura's self-efficacy theory and was developed in accordance with his instrument guide (Bandura, 2006). The scale has been shown to be reliable (Hagquist et al., 2009). In addition, a single item asking how prepared they were to cope with work as a nurse was used (the Longitudinal Analyses of Nursing Education (LANE) study; Håård et al., 2008). This question had the same response categories as the NSE.

#### 3.5.6. Psychological Empowerment

The Swedish version of Spreitzer's (1995) empowerment scale includes twelve items and measures four factors: meaning, competence, self-determination and impact. Each factor is measured using three items on a 7-point Likert scale; higher scores indicate more positive perceptions of empowerment. The scale has been shown to have acceptable psychometric properties (Hochwälder and Bergsten Brucefors, 2005).

### 3.6. Secondary Outcome Measure

#### 3.6.1. Structural Empowerment

The Conditions of Work Effectiveness Questionnaire (CWEQ II; Laschinger et al., 2001) – the Swedish version (Engström et al., 2011) – was used. In the present study, two components of structural empowerment were measured: support (3 items) and resources (3 items). In addition, perceptions of work effectiveness were measured by the two-item global empowerment scale. Response alternatives are on a 5-point scale for all items; higher scores represent more positive perceptions of empowerment. Acceptable psychometric properties have been reported (Engström et al., 2011; Laschinger et al., 2001).

### 3.7. Data Analysis

Statistical analyses were conducted using IBM SPSS Statistics, version 22.0. Non-parametric statistics: Wilcoxon signed rank test, Mann-Whitney *U* test and Chi<sup>2</sup> were used to analyze differences within (over time) and between groups. Internal consistency was measured for all instruments using Cronbach's Alpha. Non-parametric tests were used because the majority of factors did not have a normal distribution. The level for statistical significance was set at  $p \leq 0.05$  (two-tailed).

## 4. Results

### 4.1. Participant Characteristics

The sample included 70 nursing students, mean age 25 years, ranging from 19 to 48 years. The majority were female (96%), had no previous higher education (77%), lived with a partner or parents (57%) and had not worked in health care prior to nursing education (54%); Table 1 presents characteristics of the intervention and comparison group. There were no differences between participants and non-responders at baseline regarding any of the study variables or demographic characteristics. Furthermore, there were no differences between the intervention and comparison groups at baseline regarding demographic characteristics. However, the intervention group had lower self-ratings on collaborative behavior ( $p = 0.008$ ), psychological empowerment regarding the factor meaning ( $p = 0.030$ ), self-efficacy regarding both the NSE ( $p = 0.033$ ) and the single-item question 'feeling prepared to cope with work as a nurse' ( $p = 0.015$ ) at baseline compared to the comparison group.

**Table 1**  
Comparison of baseline characteristics between intervention and comparison group, number of participants (%).

	Intervention group (n = 42)	Comparison group (n = 28)	p Value
Gender			0.148 <sup>a</sup>
Female	39 (93%)	28 (100%)	
Male	3 (7%)	0	
Living arrangements			0.570 <sup>a</sup>
Live alone	18 (43%)	11 (39%)	
Live with partner/ spouse/parents	24 (57%)	16 (57%)	
Live with friend/other student	0	0	
Other	0	1 (4%)	
Previous higher education			0.816 <sup>a</sup>
Yes	10 (24%)	6 (21%)	
No	32 (76%)	22 (79%)	
Worked in health care before nurse program			0.378 <sup>a</sup>
Yes	21 (50%)	11 (39%)	
No	21 (50%)	17 (61%)	
Age Mean (SD)	25.1 (5.6)	25.5 (7.1)	0.840 <sup>b</sup>

The significance level is  $p \leq 0.05$ .

<sup>a</sup>  $\chi^2$ .

<sup>b</sup> Independent samples *t* test.

#### 4.2. Primary Outcome

When changes over time were compared between the intervention and comparison groups, differences were found for self-efficacy (NSE [ $p = 0.002$ ]), with improvement for the intervention group over time and deterioration for the comparison group (Table 2). For the other variables/tests, there were no differences between the two groups in changes over time. However, when studying each group separately over time, baseline to follow-up, the results showed improvements in the intervention group for critical thinking (CTLS, both factors and total scale [ $p$ -values range from  $<0.001$  to  $0.011$ ]), collaborative behavior (CBSS [ $p = 0.036$ ]), learning and development (perception of overall learning outcomes scale [ $p = 0.004$ ]), satisfaction with provided care (NSC [ $p < 0.001$ ]), the single item on self-efficacy ('prepared to cope with work as a nurse' [ $p = 0.003$ ]), and psychological empowerment (three out of four factors and total scale [ $p$ -values range from  $<0.001$  to  $0.003$ ]). For the comparison group, improvements over time were found for critical thinking (CTLS, one factor and total scale [ $p$ -values  $0.004$  respectively  $0.012$ ]), satisfaction with provided care (NSC [ $p = 0.012$ ]) and psychological empowerment (total scale [ $p = 0.040$ ]).

#### 4.3. Secondary Outcome

There were no differences between the two groups in changes over time for structural empowerment. When studying each group separately

**Table 2**  
Nursing students' self-rated performance in intervention and comparison group at baseline and follow-up as change over time between groups.

Measurement factors	Cronbach's $\alpha$		Intervention group (n = 42)			Comparison group (n = 28)			Change over time between groups
	Baseline	Follow-up	Mean (SD)		p-Value <sup>a</sup>	Mean (SD)		p-Value <sup>a</sup>	p-Value <sup>b</sup>
			Baseline	Follow-up		Baseline	Follow-up		
<i>Critical thinking</i>									
<i>Critical Thinking Likert Scale (CTLS)</i>									
Critical thinking related to nursing tasks	0.87	0.92	3.5 (0.9)	4.1 (0.9)	<b>&lt;0.001</b>	3.4 (0.9)	3.9 (1.0)	<b>0.004</b>	0.893
Critical thinking in general	0.78	0.84	4.8 (0.6)	5.1 (0.5)	<b>0.011</b>	4.9 (0.8)	5.0 (0.9)	0.481	0.285
Total	0.89	0.92	4.2 (0.7)	4.6 (0.7)	<b>&lt;0.001</b>	4.2 (0.8)	4.5 (0.9)	<b>0.012</b>	0.637
<i>Collaborative behavior</i>									
<i>The Collaborative Behavior Scale Shortened (CBSS)</i>									
Total	0.90	0.93	3.2 (0.5)	3.4 (0.5)	<b>0.036</b>	3.5 (0.6)	3.5 (0.7)	0.562	0.336
<i>Learning and development</i>									
<i>Thriving Scale</i>									
Vitality	0.77	0.84	5.3 (1.0)	5.6 (0.9)	0.202	5.6 (1.0)	5.9 (1.0)	0.061	0.469
Learning	0.80	0.91	6.3 (0.7)	6.4 (0.9)	0.188	6.2 (0.7)	6.3 (1.0)	0.497	0.928
Over all thriving			5.0 (1.3)	5.3 (1.2)	0.088	5.3 (1.4)	5.8 (1.1)	0.070	0.535
Total	0.85	0.92	5.8 (0.7)	6.0 (0.8)	0.117	5.9 (0.8)	6.1 (1.0)	0.131	0.883
<i>Perception of overall learning outcomes scale</i>									
Total	0.90	0.94	2.5 (0.9)	2.0 (0.9)	<b>0.004</b>	2.4 (1.0)	2.1 (1.1)	0.142	0.272
<i>Satisfaction with provided care</i>									
<i>The Nurse-specific Satisfaction with Care (NSC)</i>									
Total 9	0.87	0.92	5.4 (0.7)	5.9 (0.6)	<b>&lt;0.001</b>	5.5 (0.8)	5.8 (0.8)	<b>0.012</b>	0.646
<i>Self-efficacy</i>									
<i>Nursing Self Efficacy Scale (NSE)</i>									
Total 7	0.93	0.94	7.9 (1.8)	9.0 (1.5)	<b>&lt;0.001</b>	8.9 (1.7)	8.6 (2.4)	0.627	<b>0.002</b>
<i>Prepared to cope with work as a nurse (single-item question)</i>									
Total			8.1 (1.7)	8.9 (1.3)	<b>0.003</b>	9.2 (1.6)	9.4 (1.8)	0.500	0.133
<i>Psychological empowerment</i>									
<i>Spreitzer's empowerment scale</i>									
Meaning	0.84	0.83	5.9 (1.1)	6.1 (0.8)	0.098	6.4 (0.8)	6.4 (0.8)	0.931	0.372
Competence	0.83	0.80	4.8 (1.1)	5.2 (1.0)	<b>0.003</b>	5.1 (1.3)	5.4 (1.3)	0.156	0.450
Self-determination	0.88	0.92	3.7 (1.2)	4.4 (1.2)	<b>&lt;0.001</b>	4.0 (1.4)	4.4 (1.4)	0.103	0.559
Impact	0.90	0.94	2.8 (1.3)	3.6 (1.5)	<b>&lt;0.001</b>	2.8 (1.4)	3.3 (1.4)	0.063	0.938
Total	0.90	0.89	4.3 (0.9)	4.8 (0.8)	<b>&lt;0.001</b>	4.6 (0.9)	4.9 (0.9)	<b>0.040</b>	0.737
<i>Structural empowerment</i>									
<i>Conditions of Work Effectiveness Questionnaire-II (CWEQII)</i>									
Support	0.76	0.71	3.5 (0.8)	3.8 (0.8)	0.116	3.8 (0.9)	4.0 (0.8)	0.230	0.918
Resources	0.79	0.82	3.9 (0.8)	4.1 (0.7)	0.127	3.9 (0.7)	4.0 (0.8)	0.316	0.952
Global empowerment scale	0.60	0.70	3.5 (0.7)	3.8 (0.7)	<b>0.016</b>	3.7 (0.7)	3.9 (0.7)	0.083	0.635

The significance level is  $p \leq 0.05$ , and statistically significant results are marked with boldface text.

<sup>a</sup> Wilcoxon signed rank test.

<sup>b</sup> Mann-Whitney *U*-test.

over time, baseline to follow-up, the results showed improvements in the intervention group on the global empowerment scale ( $p = 0.016$ ) (Table 2).

## 5. Discussion

Nursing students who were given the opportunity to learn with a peer during clinical practice education had improved levels of perceived self-efficacy (NSE) seen over time compared to students supervised in the traditional manner. For the single item on self-efficacy – ‘prepared to cope with work as a nurse’ – the effect was improved over time in the intervention group, while no interaction effect was found. The NSE questions addressed how nursing students perceived their future ability to perform nursing tasks and their competencies in relation to identifying and analyzing patients’ care needs and resources and taking a stance on ethical conflicts in the care of patients, all of which are areas that nursing students usually encounter early on in their clinical practice. According to Bandura (1997), there are four main sources of self-efficacy: personal successful experiences when the capacity has been tested and goals have been achieved, observation of others who managed to perform acts that led to achieved goals, social support (cf. peer learning), and absence of strong negative emotions that may interfere with learning and development. Professional self-efficacy involves assessment of one’s own professional capacity, which for nursing students may include how confident they feel when performing typical nursing tasks. Our results regarding nursing self-efficacy (NSE) support findings from previous studies in which nursing students described peer learning as leading to increased self-efficacy (Austria et al., 2013; Hellström-Hyson et al., 2012). In contrast, Brannagan et al. (2013) found no significant differences for self-efficacy when comparing a peer teaching-learning intervention with faculty instruction in a clinical lab environment. However, the peers in their study were in different courses, which differs from the situation in the present study. According to Bandura (1997), high professional self-efficacy means perceiving that one is competent to handle the tasks and challenges of the profession, thus promoting more ambitious objectives and management of workplace stressors.

For the other variables, we did not find an interaction effect when comparing the two groups over time. However, looking at each group separately, the intervention group improved on thirteen of the twenty variables/tests over time, whereas the comparison group improved on four of them (Table 2). In the present study, improved levels of critical thinking (CTLS; the factor ‘critical thinking related to nursing tasks’ and total scale), psychological empowerment (Spreitzer’s empowerment scale; total scale), and satisfaction with provided care (NSC) were found in both groups (Table 2). Thus, these variables improved independent of the clinical practice model employed.

Interestingly, three psychological empowerment factors out of four (Spreitzer’s empowerment scale: competence, self-determination, and impact) were improved only in the intervention group when each group was studied separately over time (Table 2). Psychological empowerment is defined by Spreitzer (2008) as psychological states that are necessary for individuals to feel a sense of control in relation to their work. *Competence* refers to one’s experiences of performing work activities with skill (Spreitzer, 2008), which is consistent with peer learning review studies describing increased clinical competence (Secomb, 2008), and improved problem-solving, cognitive and motor skills (Stone et al., 2013). *Self-determination* reflects a sense of making one’s own decisions about work methods, pace, and effort (Spreitzer, 2008). Our results, showing improved values for these concepts, are in line with earlier interview studies reporting increased autonomy with time to plan and prioritize patient care (Hellström-Hyson et al., 2012). *Impact* is the degree to which one can influence strategic, administrative, or operating outcomes at work (Spreitzer, 2008). According to Spreitzer (2008), employees who have higher psychological empowerment also act to create better structural conditions, and in our study global

empowerment improved as well. The questions on global empowerment (CWEQII) concerned the extent to which students felt they were empowered to work effectively in their work environment. Although the present study is the first to make this empirical link between peer learning and empowerment, a similar link was found in a study of problem-based learning (Siu et al., 2005).

Collaboration is the key to peer learning. In accordance with our results, interview studies have described nursing students coming to understand the importance of collaboration (Chojecki et al., 2010; Hellström-Hyson et al., 2012). Collaboration is an essential part of nurses’ success in their role, and nurses’ empowerment has an impact on the degree of collaboration (Almost and Laschinger, 2002). In the present study, nursing students, learning in peers, rated improved learning and development (perception of overall learning outcomes scale) over time (Table 2). Similar results can be seen in previous interview studies showing that learning with a peer creates a learning process through increased student reflection (Chojecki et al., 2010; Morris and Stew, 2007) and through sharing information about patients’ conditions, ideas and experiences (Chojecki et al., 2010), which in turn also seem to improve critical thinking (CTLS; the factor ‘critical thinking in general’), in the present study (cf. Stone et al., 2013).

The present results must be interpreted with caution, because only one university was included, the design was quasi-experimental and the sample size may have been too small to study the effectiveness of the intervention by comparing the two groups. Quasi-experimental design increases the risk of selection bias and differences between groups. The intervention group also had lower self-ratings on four variables at baseline compared to the comparison group, which may have affected the results. However, looking at the baseline values for both groups there was still room for improvement. Demographic characteristics did not differ significantly between the groups. Thirteen of twenty variables were improved in the intervention group. The two-week intervention period might have been too short for improvements in performance. Had an extended period been used, interaction effects might also have been observed for other variables. Nonetheless, the study provided promising results, and to our knowledge no previous experimental study of peer learning has been conducted in the same context. The present results showed improvements in important skills needed in the nursing students’ future profession. Even though the sample only included one university, the students were receiving their clinical education at three different hospitals. The intervention was implemented through collaboration between the university and the county councils, which may be seen as strength to the compliance. The first author had regular contact with the clinical teachers to ensure that the intervention worked as planned, i.e. process evaluation. The clinical teachers also ensured that the intervention group received peer learning as intended and that the intervention was only implemented on the intended clinical wards, thus avoiding contamination. To prevent bias, using an experimental design with researchers blind to participants’ condition assignment would have been preferable. Two instruments, the CTLS and CBSS, were translated into Swedish and future tests of validity and reliability in different contexts are needed.

## 6. Conclusions

The results indicate that peer learning affects nursing students’ self-efficacy to a greater degree than traditional supervision does. For the other variables, we did not find an interaction effect when comparing the two groups over time. Further investigations designed as randomized controlled trials with larger groups (from several universities and perhaps at different levels in the nursing program) and conducted over an extended time period would be useful to confirm the present findings on peer learning in clinical practice education.

## Contribution

We confirm that all authors (YP, GM, EÅ, CLS, ME) have made substantial contributions to conception and design. YP and EÅ did the acquisition of data and YP and ME the analysis and interpretation of data. YP has drafted the article and all authors (YP, GM, CLS, EÅ, ME) have reviewed the article critically for important intellectual content. Finally, all authors (YP, GM, CLS, EÅ, ME) have approved the submitted version.

## Conflicts of Interest

No conflict of interest has been declared by the authors.

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